Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method executed in a computer system for producing a combined system of partial differential equations comprising:

representing each of a plurality of systems as an a separate application mode modeling physical quantities of said each system;

determining a representation of a partial differential equation system for each separate application mode corresponding to one of said plurality of systems; and

forming said combined system of partial differential equations using partial differential equation systems associated with said plurality of systems.

2. (Original) The method of Claim 1, wherein said forming said combined system is performed by machine executable code in said computer system.

3. (Original) The method of Claim 1, further comprising:

representing at least one of said physical quantities of a first of said plurality of application modes using at least one dependent variable in said partial differential equation system corresponding to first application mode.

4. (Original) The method of Claim 3, further comprising:

representing said at least one of said physical quantities directly as said at least one dependent variable.

5. (Original) The method of Claim 4, further comprising:

representing said at least one of said physical quantities using a relation between said at least one dependent variable and another variable representing said at least one physical quantity.

6. (Original) The method of Claim 5, wherein said at least one of said physical quantities is represented using at least one of: a numerical value and a mathematical expression.

7. (Original) The method of Claim 6, further comprising:

forming said mathematical expression including at least one of: a space coordinate, a time coordinate, a numerical value, and an actual physical quantity.

8. (Original) The method of Claim 1, further comprising:

associating at least one subdomain with each application mode.

9. (Original) The method of Claim 8, wherein each of said physical quantity is described by at least one physical property, and the method further comprising:

disabling at least one physical quantity and associated variables in a subdomain.

10. (Currently Amended) The method of Claim 1, further comprising:

displaying a partial differential equation in one of a: coefficient view and a general ~~from~~ form corresponding to a representation of said partial differential equation; and

modifying a portion of said partial differential equation.

11. (Original) The method of Claim 10, further comprising: modifying at least one boundary condition of said partial differential equation.

12. (Original) The method of Claim 10, further comprising:

modifying at least one coefficient of said partial differential equation.

13. (Original) The method of Claim 10, further comprising:

obtaining data using a graphical user interface in connection with said plurality of systems.

14. (Original) The method of Claim 10, further comprising:

using a graphical user interface to display and input data.

15. (Original) The method of Claim 1, further comprising:

solving said combined system of partial differential equations using a coefficient form of said combined system of partial differential equations.

16. (Currently Amended) The method of Claim 1, further comprising:

solving said combined system of partial differential equations using a general form of said combined system of partial differential equations.

17. (Original) The method of Claim 16, further comprising:

converting at least one partial differential equation system included in said combined system of partial differential equations from coefficient to general form.

18. (Original) The method of Claim 17, further comprising:

converting said combined system of partial differential equations from coefficient to general form.

19. (Original) The method of Claim 18, further comprising:

using linearization of a general form to solve for a non-linear system of partial differential equations.

20. (Original) The method of Claim 19, further comprising:

using a Newton method in solving for said non-linear system of partial differential equations.

21. (Original) The method of Claim 1, further comprising:

solving said combined system of partial differential equations.

22. (Original) The method of Claim 21, wherein solving said combined system further includes:

selecting a portion of physical quantities in said combined system of partial differential equations;

solving for one or more variables associated with said portion of physical quantities.

23. (Original) The method of Claim 22, further comprising:

using values associated with physical quantities not included in said portion for specifying initial conditions.

24. (Original) The method of Claim 21, further comprising:

selecting a solver type specifying a particular technique used in solving said combined system of partial differential equations.

25. (Original) The method of Claim 24, wherein said solver type uses a finite element method.

26. (Original) The method of Claim 1, further comprising:

using a graphical user interface in connection with input data;

storing said input data in a representation in a data structure stored in a memory of the computer system; and

converting said input data into an intermediate form wherein said intermediate form for each system of partial differential equations associated with said plurality of systems is used in forming said combined system.

27. (Original) The method of Claim 1, further comprising:

determining a submode setting associated with one of the partial differential equation systems associated with said plurality of systems; and

determining a number of variables included in said one partial differential equation system in accordance with said submode setting and a type of a corresponding application mode.

28. (Original) The method of Claim 27, wherein said submode is one of stationary, time dependent, linear, non-linear, scalar and multi-component.

29. (Original) The method of Claim 1, further comprising:

selecting at least one application mode.

30. (Original) The method of Claim 29, wherein said at least one application mode is one of predefined and user defined.

31. (Original) The method of Claim 30, further comprising:

modifying a set of routines associated with a predefined application mode to be used in connection with a user defined application mode.

32. (Original) The method of Claim 1, wherein one of said plurality systems being modeled is a one-dimensional geometry model.

33. (Original) The method of Claim 1, wherein one of said plurality systems being modeled is a two-dimensional geometry model.

34. (Original) The method of Claim 1, wherein one of said plurality of systems being modeled is a three-dimensional geometry model.

35. (Original) The method of Claim 31, further comprising:

defining a user-defined application mode.

36. (Original) The method of Claim 35, wherein said defining a user-defined application mode further comprises:

defining an object class corresponding to said user-defined application mode; and

defining a first portion of methods included in said object class using functionality that is inherited from other classes.

37. (Original) The method of Claim 36, further comprising:

overloading a second portion of methods to provide alternative functionality.

38. (Original) The method of Claim 37, further comprising:

using overloading in connection with at least one method to disable functionality of said at least one method.

39. (Original) The method of Claim 31, further comprising:

defining an application that is a subclass of an existing class corresponding to functionality of an application mode.

40. (Original) The method of Claim 39, wherein said application mode is user-defined.

41. (Original) The method of Claim 39, wherein said application mode is predefined.

42. (Currently Amended) A computer program product for producing a combined system of partial differential equations comprising:

machine executable code for representing each of a plurality of systems as ~~an~~ a separate application mode modeling physical quantities of said each system;

machine executable code for determining a representation of a partial differential equation system for each separate application mode corresponding to one of said plurality of systems; and

machine executable code for forming said combined system of partial differential equations using partial differential equation systems associated with said plurality of systems.

43. (Original) The computer program product of Claim 42, further comprising:

machine executable code for representing at least one of said physical quantities of a first of said plurality of application modes using at least one dependent variable in said partial differential equation system corresponding to first application mode.

44. (Original) The computer program product of Claim 43, further comprising:

machine executable code for representing said at least one of said physical quantities directly as said at least one dependent variable.

45. (Original) The computer program product of Claim 44, further comprising:

machine executable code for representing said at least one of said physical quantities using a relation between said at least one dependent variable and another variable representing said at least one physical quantity.

46. (Original) The computer program product of Claim 45, wherein said at least one of said physical quantities is represented using at least one of: a numerical value and a mathematical expression.

47. (Original) The computer program product of Claim 46, further comprising:

machine executable code for forming said mathematical expression including at least one of: a space coordinate, a time coordinate, a numerical value, and an actual physical quantity.

48. (Original) The computer program product of Claim 42, further comprising:

machine executable code for associating at least one subdomain with each application mode.

49. (Original) The computer program product of Claim 48, wherein each of said physical quantity is described by at least one physical property, and the computer program product further comprises:

machine executable code for disabling at least one physical quantity and associated variables for a portion of a subdomain.

50. (Currently Amended) The computer program product of Claim 42, further comprising:

machine executable code for displaying a partial differential equation in one of a: coefficient view and a general ~~from~~ form corresponding to a representation of said partial differential equation; and

machine executable code for modifying a portion of said partial differential equation.

51. (Original) The computer program product of Claim 50, further comprising:

machine executable code for modifying at least one boundary condition of said partial differential equation.

52. (Original) The computer program product of Claim 50, further comprising:

machine executable code for modifying at least one coefficient of said partial differential equation.

53. (Original) The computer program product of Claim 50, further comprising:

machine executable code for obtaining data using a graphical user interface in connection with said plurality of systems.

54. (Original) The computer program product of Claim 50, further comprising:

machine executable code for using a graphical user interface to display and input data.

55. (Original) The computer program product of Claim 42, further comprising:

machine executable code for solving said combined system of partial differential equations using a coefficient form of said combined system of partial differential equations.

56. (Currently Amended) The computer program product of Claim 42, further comprising:

machine executable code for solving said combined system of partial differential equations using a general form of said combined system of partial differential equations.

57. (Original) The computer program product of Claim 56, further comprising:

machine executable code for converting at least one partial differential equation system included in said combined system of partial differential equations from coefficient to general form.

58. (Original) The computer program product of Claim 57, further comprising:

machine executable code for converting said combined system of partial differential equations from coefficient to general form.

59. (Original) The computer program product of Claim 58, further comprising:

machine executable code for using linearization of a general form to solve for a non-linear system of partial differential equations.

60. (Original) The computer program product of Claim 59, further comprising:

machine executable code for using a Newton method in solving for said non-linear system of partial differential equations.

61. (Original) The computer program product of Claim 42, further comprising:

machine executable code for solving said combined system of partial differential equations.

62. (Original) The computer program product of Claim 61, wherein said machine executable code for solving said combined system further includes:

machine executable code for selecting a portion of physical quantities in said combined system of partial differential equations; and

machine executable code for solving for one or more variables associated with said portion of variables.

63. (Original) The computer program product of Claim 62, further comprising:

machine executable code for using values associated with physical quantities not included in said portion for specifying initial conditions.

64. (Original) The computer program product of Claim 61, further comprising:

machine executable code for selecting a solver type specifying a particular technique used in solving said combined system of partial differential equations.

65. (Original) The computer program product of Claim 64, wherein said solver type includes machine executable code for solving a system of partial differential equations using a finite element method.

66. (Original) The computer program product of Claim 42, further comprising:

machine executable code for using a graphical user interface in connection with input data;

machine executable code for storing said input data in a representation in a data structure stored in a memory of the computer system; and

machine executable code for converting said input data into an intermediate form wherein said intermediate form for each system of partial differential equations associated with said plurality of systems is used in forming said combined system.

67. (Original) The computer program product of Claim 42, further comprising:

machine executable code for determining a submode setting associated with one of the partial differential equation systems associated with said plurality of systems; and

machine executable code for determining a number of variables included in said one partial differential equation system in accordance with said submode setting and a type of a corresponding application mode.

68. (Original) The computer program product of Claim 67, wherein said submode is one of stationary, time dependent, linear, non-linear, scalar and multi-component.

69. (Original) The computer program product of Claim 42, further comprising:

machine executable code for selecting at least one application mode.

70. (Original) The method of Claim 69, wherein said at least one application mode is one of predefined and user defined.

71. (Original) The computer program product of Claim 70, further comprising:

machine executable code for defining a user defined application mode; and

machine executable code for modifying a set of routines associated with a predefined application mode to be used in connection with a user defined application mode.

72. (Original) The computer program product of Claim 42, wherein one of said plurality systems being modeled is a one-dimensional geometry model.

73. (Original) The computer program product of Claim 42, wherein one of said plurality systems being modeled is a two-dimensional geometry model.

74. (Original) The computer program product of Claim 42, wherein one of said plurality of systems being modeled is a three-dimensional geometry model.

75. (Original) The computer program product of Claim 42, further comprising:

defining a user-defined application mode.

76. (Original) The computer program product of Claim 75, wherein said machine executable code for defining a user-defined application mode further comprises:

machine executable code for defining an object class corresponding to said user-defined application mode; and

machine executable code for defining a first portion of methods included in said object class using functionality that is inherited from other classes.

77. (Original) The computer program product of Claim 76, further comprising:

machine executable code for overloading a second portion of methods to provide alternative functionality.

78. (Original) The computer program product of Claim 77, further comprising:

machine executable code for using overloading in connection with at least one method to disable functionality of said at least one method.

79. (Original) The computer program product of Claim 42, further comprising:

machine executable code for defining an application that is a subclass of an existing class corresponding to functionality of an application mode.

80. (Original) The computer program product of Claim 79, wherein said application mode is user-defined.

81. (Original) The computer program product of Claim 79, wherein said application mode is predefined.

82. (Currently Amended) A method executed in a computer system for solving a system of partial differential equations comprising:

defining at least one a plurality of user-defined application mode modes modeling physical quantities of an associated model; and

determining a representation of said partial differential equation system for said user-defined application mode modes of said associated model.

83. (Original) The method of Claim 82, further comprising:

solving for said partial differential equation system using a finite element method.

84. (Original) The method of Claim 82, wherein said user-defined application mode is one of: a one-dimensional model, a two-dimensional model and a three-dimensional model.

85. (Original) The method of Claim 84, wherein said defining a user-defined application mode further comprises:

defining an object class corresponding to said user-defined application mode; and

defining a first portion of methods included in said object class using functionality that is inherited from other classes.

86. (Original) The method of Claim 85, further comprising:

overloading a second portion of methods to provide alternative functionality.

87. (Original) The method of Claim 86, further comprising:

using overloading in connection with at least one method to disable functionality of said at least one method.

88. (Original) The method of Claim 87, further comprising:

selecting a plurality of application modes associated with a plurality of systems, said user-defined application being one of said plurality of application modes selected; and

forming a combined system of partial differential equations using partial differential equation systems associated with said plurality of application modes.

89. (Original) The method of Claim 82, further comprising:

defining at least one user-defined application that is a subclass of an existing class associated with an application mode.

90. (Original) The method of Claim 89, wherein said application mode associated with said existing class is user-defined.

91. (Original) The method of Claim 89, wherein said application mode associated with said existing class is predefined.

92. (Currently Amended) A computer program product for solving a system of partial differential equations comprising:

machine executable code for defining ~~at least one~~ a plurality of user-defined application ~~mode~~ modes modeling physical quantities of an associated model; and

machine executable code for determining a representation of said partial differential equation system for said user-defined application ~~mode~~ modes of said associated model.

93. (Original) The computer program product of Claim 92, further comprising:

machine executable code for solving for said partial differential equation system using a finite element method.

94. (Original) The computer program product of Claim 92, wherein said user-defined application mode is one of: a one-dimensional model, a two-dimensional model and a three-dimensional model.

95. (Original) The computer program product of Claim 94, wherein said machine executable code for defining a user-defined application mode further comprises:

machine executable code for defining an object class corresponding to said user-defined application mode; and

machine executable code for defining a first portion of methods included in said object class using functionality that is inherited from other classes.

96. (Original) The computer program product of Claim 95, further comprising:

machine executable code for overloading a second portion of methods to provide alternative functionality.

97. (Original) The computer program product of Claim 96, further comprising:

machine executable code for using overloading in connection with at least one method to disable functionality of said at least one method.

98. (Original) The computer program product of Claim 97, further comprising:

machine executable code for selecting a plurality of application modes associated with a plurality of systems, said user-defined application being one of said plurality of application modes selected; and

machine executable code for forming a combined system of partial differential equations using partial differential equation systems associated with said plurality of application modes.

99. (Original) The computer program product of Claim 92, further comprising:

machine executable code for defining at least one user-defined application that is a subclass of an existing class associated with an application mode.

100. (Original) The computer program product of Claim 99, wherein said application mode associated with said existing class is user-defined.

101. (Original) The computer program product of Claim 99, wherein said application mode associated with said existing class is predefined.